

## EXTRACTION AND PURIFICATION OF CURCUMIN FROM TURMERIC

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### ABSTRACT

Indian medicinal traditions have traditionally used turmeric as a potent anti-inflammatory. Turmeric's bright yellow-orange color has earned it the nickname "Indian saffron" in the past. It is used as a textile dye, spice, and medicinal cure. Curcuminoids, which differ in their molecular and physicochemical structures, are abundant in turmeric Qualities. The Soxhlet extractor machine is used in the current work to extract curcuminoids. Using thin-layer chromatography, curcuminoids were purified and quantified. Within the TLC maximum Final extract (made with Hexane) was carried out Soxhlet reported a curcumin yield percentage of 4.09%. Extraction technique. Various extraction solvents were utilized, with acetone exhibiting the highest yield of all. Curcuminoids. Testing of curcuminoids' separation in TLC chloroform revealed that methanol at 95:5 RF

**Keywords:** Turmeric; Curcuminoids; Soxhlet extractor unit; TLC

### INTRODUCTION:

Turmeric (*Curcuma longa* L.) is medicinal plant which mostly found in south Asia. Turmeric has long been used as a Powerful anti-bacterial, anti-oxidant and anti-inflammatory in Indian systems of medicine. Turmeric's bright yellow-orange color has earned it the nickname "Indian saffron" in the past. It is used as a textile dye, condiment, and medicinal. Curcuminoids, which differ in their chemical structures and physico-chemical properties, are abundant in turmeric. Turmeric contains three different compounds: curcumin, demethoxycurcumin, and bisdemethoxycurcumin. These three substances are collectively referred to as curcuminoid. The primary ingredient in turmeric, curcumin, is what gives the plant its yellow hue. Given its high cost and anti-cancer properties, curcumin is a supplement best avoided. Expansion of malignant cells within the body. Farmers in Asia

and India can market curcumin as a secondary crop of great value. In contrast to turmeric, curcumin functions as "Agri-gold" for farmers. In the current study, we concentrated on Curcuminoids are extracted, purified, and quantified using a Soxhlet extractor machine .

### MATERIAL AND METHOD

#### SUBSTRATE:

Local variation of *curcuma longa* (turmeric) gathered from Nanded District. Every chemical or solvent utilized was of AR quality and came from Himedia. The local varieties of turmeric that were chosen were the salem, china salem, and Krishna. For the extraction process, fresh turmeric rhizomes were utilized. Rhizomes were gathered, cleaned, chopped into little pieces, and dried in the oven. And pulverized in order to obtain.

**METHOD OF EXTRACTION:**

The Soxhlet extraction method was utilized to extract curcuminoids. Fresh rhizomes were cleaned, rinsed with deionized water, cut into slices, and dried for a week in the sun before being dried once more for six hours at 50°C in a hot air oven. These dried rhizomes were chopped into tiny pieces and ground into a powder using an electronic mill. Six grams of the sample were put into a thimble. 250 milliliters of solvent were added to a Soxhlet apparatus, and the samples were extracted for seven hours based on their boiling point. The solvents that were utilized were acetone (BP=56.53°C), methanol (BP=65°C), and chloroform (BP=61°C).

**MODES:**

After completion of extraction the dark brown extract was then cooled, concentrated using rotary evaporator. This Crude dried extract which was turning black orange in colour. Each raw sample of turmeric was extracted by an Equivalent method and yield was calculated

$\% \text{ of curcumin} = \frac{\text{Dry wt of extracted curcumin}}{\text{Total wt of turmeric}} \times 100$

Once the extraction process was finished, the dark brown extract was cooled and concentrated using a rotary evaporator. This raw, dehydrated extract was taking on a dark orange hue. An equivalent method was used to extract each raw sample of turmeric, and the yield was computed.

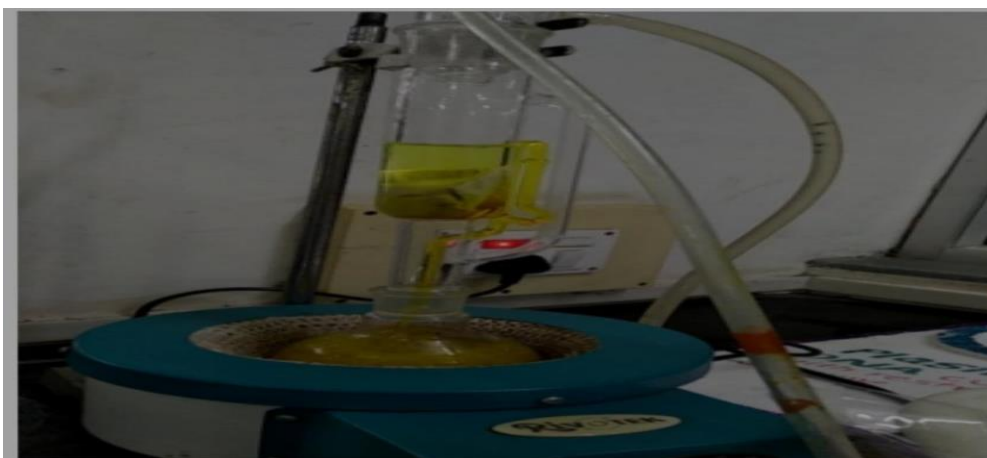
**SEPARATION OF CURCUMINOIDS BY TLC:**

Using TLC, solvent extracts from acetone and methanol were examined for the presence of various curcuminoids. Chloroform: The thin layer chromatography pre-coated silica gel plates were used. Each plate was developed to a height of approximately 6.8 cm using a glass beaker that had been pre-saturated with mobile phase for 20 minutes.

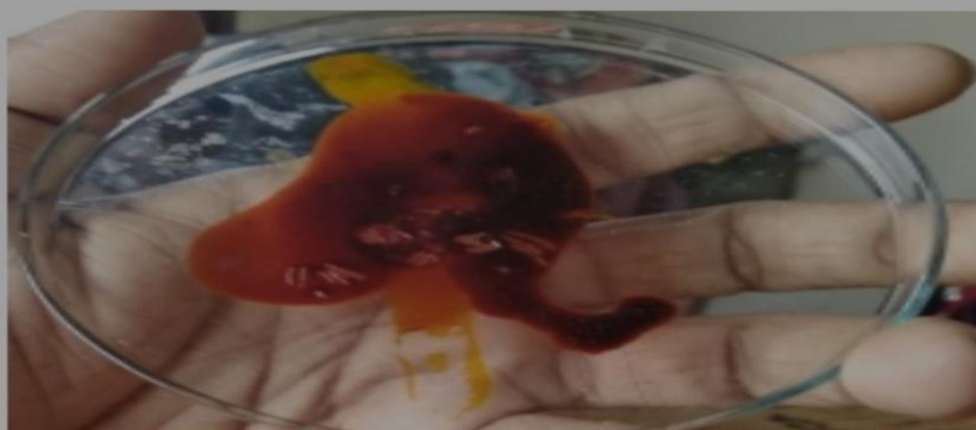
A 95:5 composition was employed with methanol as the mobile phase [6]. Following the chromatogram's development, plates were Eliminated, dried, and the spots examined .

**RESULTS AND DISCUSSION:**

The soxhlet extraction method for curcuminoids from turmeric was studied using various collected varieties of turmeric from Nanded district, Maharashtra (Figure 1). Following drying, the weight of the Soxhlet extract was determined, along with the weight percentage of curcuminoids. Three regional varieties of turmeric—Selam, Kadappa, and China—were used in this investigation. Selam, in order to extract. Several solvents were used to create the dried powder, which was then used for the Soxhlet extraction method. After drying, this extract took on the color of dark black orange .Fig.1&2 After being dried and measured, the extracted curcuminoids' percentage was displayed in Table 1. Of all the Using acetone solvent, the turmeric varieties from China Selam exhibited the highest curcuminoids, 4.2%. Additionally, methanol is A suitable solvent for curcuminoids extraction maximal focus.



**Figure 1: Soxhlet extractor unit.**



**Figure 2: Extracted curcumin.**

Table 1: Extraction of curcuminoids using Soxhlet method.		
Variety	Solvent	Curcuminoid (%)
Selam (10 gm)	Ethanol	3.6
	Methanol	3.4
	Acetone	3.9
Kadappa (10 gm)	Ethanol	3.1
	Methanol	3.7
	Acetone	3.8
China selam (10 gm)	Ethanol	3.3
	Methanol	4.0
	Acetone	4.2

*Figure 3: TLC of isolated curcuminoids*



### CONCLUSION:

In this study, we used a Soxhlet extractor to extract natural curcuminoids. Using acetone solvent, we discovered that China Selam had the highest curcuminoids of all the turmeric varieties, at 4.2%. Since curcumin is a more valuable and medicinal product than turmeric for

farmers, it can be extracted and sold to them as “Agri-gold.” In this our current work, we have discovered that acetone and china selam yield superior extraction results for curcumin. In subsequent research Should be conducted to evaluate curcumin’s therapeutic potential.

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### REFERENCES

1. Kulkarni SJ, Maske KN, Budre MP, Mahajan RP. Extraction and purification of curcuminoids from Turmeric (*Curcuma longa* L.). *Int J PharmacolPharmaceut Technol.* 2017.
2. Aggarwal BB, Kumar A, Bharti AC. Anticancer potential of curcumin: Preclinical and clinical studies. *Anticancer Res.* 2003. 23:363-398.
3. Nabati M, Mahkam M, Heidari H. Isolation and characterization of curcumin from powdered rhizomes of turmeric Plant marketed in Maragheh city of Iran with soxhlet technique. *J Iran ChemCommun.* 2014, 2:236-243.
4. Paramapojn S, Gritsanapan W. Radical scavenging activity determination and quantitative chemical analysis of Curcuminoids in *Curcuma zedoaria* rhizome extracts by HPLC method. *Curr Sci.* 2009, 97:1069-10107
5. Schieffer GW. Pressurized liquid extraction of curcuminoids and curcuminoid degradation products from 25 Turmeric (*Curcuma longa*) with subsequent HPLC assays. *J LiqChromatogrRelat Technol.* 2002, 25:3033-3044.
6. Preeti Nigam, Shobha Waghmode, Michelle Louis, Shishanka Wangnoo, Pooja Chavan and Dhiman Sarkar. Graphene quantum dots conjugated albumin nanoparticles for targeted drug delivery and imaging of pancreatic cancer. *J. Mater. Chem. B*, 2014, 2, 3190-3195, DOI: 10.1039/C4TB00015C.
7. Omkar Pawar, Neelima Deshpande, Sharada Dagade, Preeti Nigam-Joshie, Shobha Waghmode. Green synthesis of silver nanoparticles from purple acid phosphatase apo-enzyme Omkar isolated from a new source *Limonia acidissima*. *J.of Expt.Nanoscience.*,doi.org/10.1080/17458080.2015.1025300, Published online: 27 Mar 2015.
8. Graphene Foam: Next Generation Graphene Analogue, Butala Deepali and Waghmode Shobha, *Research Journal of Chemistry and Environment* Vol. 24 (8)August (2020), 1-11.
9. Patil, U.D., Waghmode, S., Pingale, S.S. et al. Quinoline-infused graphene carbon cages: an ecofriendly approach towards environmental remediation. *Res Chem Intermed* 49, 4217–4237 (2023). <https://doi.org/10.1007/s11164-023-05098-0>.
10. Shobha Waghmode, Pooja Chavan, Vidya Kalyankar, and Sharada Dagade. Synthesis of Silver Nanoparticles Using *Triticum aestivum* and Its Effect on Peroxide Catalytic Activity and Toxicology. *Journal of Chemistry*, Volume 2013, Article ID 265864, 5 pages, <http://dx.doi.org/10.1155/2013/265864>.